

What is claimed is:

1 1. A method for use in a wellbore, comprising:
2 causing creation of tunnels in surrounding formation of a well interval;
3 applying treatment fluid to the tunnels; and
4 creating a local transient underbalance condition in the well interval after
5 creation of the tunnels in the formation and application of the treatment fluids.

1 2. The method of claim 1, wherein creating the local transient underbalance
2 condition causes a surge of fluid flow out of the tunnels to clean the tunnels.

1 3. The method of claim 1, wherein causing the creation of tunnels comprises
2 firing a perforating gun.

1 4. The method of claim 1, wherein applying the treatment fluid comprises
2 applying a matrix treatment fluid.

1 5. The method of claim 1, wherein applying the treatment fluid comprises
2 applying at least one of acid, chelant, solvent, surfactant, brine, oil, and enzyme.

1 6. The method of claim 1, wherein creating the local transient underbalance
2 condition comprises:
3 providing a surge chamber; and
4 opening at least one port to the surge chamber to create a fluid surge into
5 the surge chamber.

1 7. The method of claim 1, wherein creation of the local transient
2 underbalance causes performance of a surge operation to clean the tunnels, the method
3 further comprising performing a fracture operation after the surge operation.

1 8. The method of claim 7, further comprising performing a gravel pack
2 operation after the fracture operation.

1 9. The method of claim 1, wherein creating the local transient underbalance
2 causes performance of a surge operation to clean the tunnels, the method further
3 comprising performing a gravel pack operation.

1 10. The method of claim 1, wherein applying the treatment fluid comprises
2 activating an applicator tool to apply the treatment fluid.

1 11. The method of claim 10, wherein activating the applicator tool comprises
2 opening at least one port of the applicator tool.

1 12. The method of claim 1, wherein applying the treatment fluid comprises
2 applying the treatment fluid in presence of an overbalance condition.

1 13. The method of claim 12, further comprising activating a perforating gun to
2 create the overbalance condition, the overbalance condition comprising a transient
3 overbalance condition.

1 14. The method of claim 13, wherein activating the perforating gun comprises
2 activating a tubing conveyed perforating gun.

1 15. The method of claim 13, wherein applying the treatment fluid comprises
2 applying an acid to flow into the tunnels due to the presence of the overbalance condition.

1 16. The method of claim 15, wherein applying the acid comprises flowing a
2 substantially equal amount of acid into each of the tunnels.

1 17. The method of claim 1, wherein applying the treatment fluid comprises
2 applying a brine to reduce surface tension within the tunnels.

- 1 18. The method of claim 1, wherein applying the treatment fluid comprises
2 applying a surfactant to enhance the transport of debris out of the tunnels.
- 1 19. The method of claim 1, wherein applying the treatment fluid comprises
2 applying a fluid to enhance cleanup of the tunnels.
- 1 20. The method of claim 1, further comprising applying a sequence of
2 pressure conditions in the wellbore interval, the sequence of pressure conditions
3 comprising the transient underbalance condition and other pressure conditions.
- 1 21. The method of claim 20, wherein applying the other pressure conditions
2 comprises applying at least one of an underbalance condition, overbalance condition, and
3 balanced condition.
- 1 22. A tool string for use in a well having a formation with tunnels formed
2 therein, comprising:
3 an applicator device adapted to apply treatment fluid into the tunnels; and
4 a surge device adapted to create a local transient underbalance condition to
5 cause flow of fluid from the tunnels.
- 1 23. The tool string of claim 22, further comprising a perforating gun.
- 1 24. The tool string of claim 22, wherein the applicator device includes one or
2 more ports activatable to enable the application of the treatment fluid.
- 1 25. The tool string of claim 24, further comprising another device adapted to
2 create an overbalance condition to enable the application of the treatment fluid into the
3 tunnels.
- 1 26. The tool string of claim 25, wherein the another device comprises a
2 perforating gun.

1 27. The tool string of claim 22, wherein the surge device comprises:
2 a low pressure chamber; and
3 at least one port selectively openable to enable communication between
4 the chamber and a wellbore region,
5 the at least one port when opened creating a fluid surge into the chamber
6 to provide the local transient underbalance condition.

1 28. The tool string of claim 27, wherein the port comprises a valve.

1 29. The tool string of claim 27, wherein the port comprises a fluid blocking
2 element adapted to be broken by an explosive force.

1 30. The tool string of claim 29, further comprising an explosive element
2 positioned proximal the fluid blocking element.

1 31. The tool string of claim 22, further comprising a plurality of sections, each
2 section comprising an applicator device to apply a treatment fluid and a surge device.

1 32. The tool string of claim 31, wherein the plurality of sections are adapted to
2 be activated at different times.

1 33. The tool string of claim 22, further comprising a plurality of sections, each
2 section comprising a combination of one or more of the following: perforating gun,
3 applicator device to apply a treatment fluid, and a surge device.

1 34. The tool string of claim 22, further comprising an assembly adapted to
2 perform a fracture operation after cleanup of the tunnels caused by flow of fluids from
3 the tunnel in the presence of the local transient underbalance condition.

1 35. A method comprising:
2 storing information relating to surge characteristics for different types of
3 wellbores;
4 for a target wellbore, determining its type;
5 determining one or more treatment fluids selected for use in treatment of
6 perforation tunnels; and
7 selecting surge characteristics based on selected one or more treatment
8 fluids and the determined type of wellbore using the stored information.

1 36. The method of claim 35, wherein selecting the surge characteristics
2 comprises selecting a time delay between a perforating operation and a surge operation.

1 37. The method of claim 35, wherein selecting the surge characteristics
2 comprises selecting a volume of a chamber containing a low pressure to generate the
3 surge operation.